

REMARKS

Applicants respectfully extend their appreciation for the time extended to applicants' attorney in a telephone interview on January 5, 2006. Entry of the foregoing and reconsideration of the subject matter in light of the remarks which follow are respectfully requested.

Claims 1 - 20 are currently pending in the application and are under consideration.

By the amendments, the Specification has been revised in response to the objection in Tables 1, 4, and 5. The comma in Table 1 has been replaced by a period. The units for lignin in Tables 4 and 5 have been corrected to recite that the units are microns as disclosed in paragraph (0008).

Claims 1 - 13, 18 stand rejected under 35 U. S. C. {112, second paragraph as failing to comply with the written description and the enablement requirements and for being indefinite for failing to particularly point out the invention.

In the Specification and claims, the material recited as lignin is a well-known material and is fully defined in many dictionaries and encyclopedias. A search in the U. S. Patent and Trademark Office for the use of the material lignin in issued claims provided 1778 hits (attachment A) and in specifications provided 3379 hits (attachment B). A review of several of the issued patents using the material lignin did not disclose any physical and chemical characteristics since lignin is a material known widely in the literature. In the Encyclopedia American International edition, lignin is defined as a complex organic material in which the chemical structure is not fully understood (attachment C). The New Encyclopedia Britannica defines lignin as a complex oxygen-containing organic substance of apparently polymeric compounds of poorly known structure (attachment D). The U. S. Patent and Trademark Office class 106 compositions defines lignin as a noncarbohydrate polymeric substance having a structure that is not completely known (attachment E). Other definitions of lignin are contained in attachment F. It is respectfully submitted that the 35 U.S.C. {112 rejections have been overcome by the above discussions.

Claim 3 is corrected by substituting "consisting of" for "comprising" and corrected the spelling of "polyacrylic acid".

Claims 4, 8, and 10 - 13 are amended by providing the necessary antecedent basis for "contains at least one additional additive".

Claim 5 is amended by providing the necessary antecedent basis for

"wherein the electrolytes" and "contains an antimony".

Claim 9 is an independent claim and "0,1%" was corrected to read "0.1%".

Claim 14 is amended to more definitively define the process invention in which the process involves discharging a lead-acid battery having a sufficient charge so that the battery can be discharged at a high current of at least 0.3C for a time period of at least one minute. Support for this can be found in paragraphs (0009) and (0011).

Claim 16 is canceled.

Claim 17 is amended to overcome the unclear rejection.

Claim 20 is amended to provide proper antecedent for "wherein the additive".

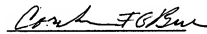
The Double Patenting rejection is overcome by filing with this amendment, the cancellation of the co-pending Application No. 10/439,258 but not the invention. The undersigned is a registered attorney representing both the subject application and Application No. 10/439,258.

The cited art by the Examiner has been reviewed and it is respectfully submitted that they do not obviate or disclose the subject invention as amended.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited..

If the Examiner has any questions or concerns regarding this Amendment or the application in general, please contact the undersigned at (203) 966-2055.

Respectfully submitted,


Cornelius F. O'Brien
Attorney for Applicants
Reg # 24579

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acdm/lignin

PAT. NO. Title

- 1 6,964,302 [T Zeolite-containing cement composition](#)
- 2 6,955,743 [T Method for producing furfural, acetic acid and formic acid from spent pulp-cooking liquor](#)
- 3 6,953,090 [T Cementing subterranean zones using cement compositions containing biodegradable dispersants](#)
- 4 6,946,541 [T Composition based on renewable raw materials](#)
- 5 6,946,057 [T Alkaline process for the manufacturing of pulp using alkali metaborate as buffering alkali](#)
- 6 6,942,973 [T Methods for isolating genes from microorganisms](#)
- 7 6,942,754 [T Process for producing xylooligosaccharide from lignocellulose pulp](#)
- 8 6,942,727 [T High early-strength fiber reinforced cementitious composition](#)
- 9 6,942,726 [T Cementitious material reinforced with chemically treated cellulose fiber](#)
- 10 6,941,720 [T Composite building material](#)
- 11 6,940,073 [T Method for determining the concentration of hydrogen peroxide in a process stream and a spectrophotometric system for the same](#)
- 12 6,939,830 [T Method for fighting soil insects with phenyl-pyrazoles](#)
- 13 6,936,834 [T Method and apparatus for determining stone cells in paper or pulp](#)
- 14 6,936,681 [T Slow release nitrogen fertilizer](#)
- 15 6,932,921 [T Electrically conductive polymer films](#)
- 16 6,930,223 [T Method for altering storage organ composition](#)
- 17 6,923,912 [T Method of wastewater treatment utilizing white rot and brown rot fungi](#)
- 18 6,923,887 [T Method for hydrogen peroxide bleaching of pulp using an organic solvent in the bleaching medium](#)
- 19 6,918,956 [T Binder for aggregate, foundry cores, and other products](#)

- 20 6,910,284 [T](#) [Wood accelerating drying process based on its rheological properties](#)
- 21 6,908,995 [T](#) [Production of carbohydrates, alcohol and resins from biomass](#)
- 22 6,908,522 [T](#) [Leaf binding method and compositions therefor](#)
- 23 6,906,239 [T](#) [Plant preparations](#)
- 24 6,905,028 [T](#) [Method of separation by altering molecular structures](#)
- 25 6,902,918 [T](#) [Oxygenase enzymes and screening method](#)
- 26 6,902,649 [T](#) [Enhanced fiber additive; and use](#)
- 27 6,899,791 [T](#) [Method of pretreating lignocellulose fiber-containing material in a pulp refining process](#)
- 28 6,896,813 [T](#) [Sorbant sequestration and removal of toxic metal ions](#)
- 29 6,896,806 [T](#) [Biological process for color reduction of pulp and paper effluent](#)
- 30 6,894,092 [T](#) [Aqueous asphalt emulsions containing liquefied or devulcanized recycled rubber](#)
- 31 6,890,456 [T](#) [Cathode electroactive material, production method therefor and secondary cell](#)
- 32 6,890,451 [T](#) [Environmentally benign anti-icing or deicing fluids employing triglyceride processing by-products](#)
- 33 6,887,810 [T](#) [Synthetic, refractory material for refractory products, and process for producing the product](#)
- 34 6,887,351 [T](#) [Process for regulating the porosity and printing properties of paper by use of colloidal precipitated calcium carbonate, and paper containing such colloidal precipitated calcium carbonate](#)
- 35 6,884,756 [T](#) [Water-dispersible pellets](#)
- 36 6,884,754 [T](#) [Aqueous compositions for seed treatment](#)
- 37 6,884,320 [T](#) [Method and apparatus for producing and testing a fiber bed](#)
- 38 6,878,781 [T](#) [Poly\(arylene ether\)-containing thermoset composition in powder form, method for the preparation thereof, and articles derived therefrom](#)
- 39 6,878,180 [T](#) [Combination ammonium sulfate/drift reducing adjuvant and wet bond process for making the same](#)
- 40 6,872,526 [T](#) [High throughput screening for novel Bioactivities](#)
- 41 6,872,246 [T](#) [Fiber cement composite materials using cellulose fibers loaded with inorganic and/or organic substances](#)
- 42 6,872,242 [T](#) [Fireproof mixture and elastifier for the same and method for its production](#)
- 43 6,871,746 [T](#) [Ancillary filtering agent](#)
- 44 6,861,079 [T](#) [Fertility kit](#)
- 45 6,858,074 [T](#) [High early-strength cementitious composition](#)
- 46 6,855,864 [T](#) [Methods for simultaneous control of lignin content and composition, and cellulose content in plants](#)
- 47 6,855,327 [T](#) [Pesticide dispersant](#)
- 48 6,855,182 [T](#) [Lignocellulose fiber composite with soil conditioners](#)
- 49 6,855,180 [T](#) [Catalytic cellulignin fuel](#)
- 50 6,852,234 [T](#) [Apparatus and method for in situ burning of oil spills](#)
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PUB. APP. NO.	Title
1 20050288448	<u>Method for vulcanizing caoutchouc or latex by applying a mixture of sulfur and a complexing agent</u>
2 20050288309	<u>Fungicidal mixtures</u>
3 20050288202	<u>Stable oxidizer composition for use in formulations</u>
4 20050287894	<u>Articles of enhanced flamability resistance</u>
5 20050287647	<u>Plant artificial chromosomes, uses thereof and methods of preparing plant artificial chromosomes</u>
6 20050287639	<u>Methods of incorporating amino acid analogs into proteins</u>
7 20050287385	<u>Paperboard material having increased strength and method for making same</u>
8 20050287282	<u>Cereal-Based Adhesives and Their Uses</u>
9 20050287223	<u>Use of amniotic membrane as biocompatible devices</u>
10 20050287111	<u>Films for controlled cell growth and adhesion</u>
11 20050284594	<u>Screen assembly for a pulp digester</u>
12 20050284593	<u>Method for treatment of spent liquor</u>
13 20050284592	<u>Methods to decrease scaling in digester systems</u>
14 20050283853	<u>Methods and genetic compositions to limit outcrossing and undesired gene flow in crop plants</u>
15 20050283850	<u>Multi-gene expression constructs containing modified inteins</u>
16 20050282988	<u>Formaldehyde-free lignocellulosic adhesives and composites made from the adhesives</u>
17 20050282925	<u>Thin films for controlled protein interaction</u>
18 20050282888	<u>Fungicidal composition</u>
19 20050282868	<u>Substituted anthranilamides for controlling invertebrate pests</u>
20 20050282261	<u>Novel choline oxidases</u>
21 20050281999	<u>Structural and other composite materials and methods for making same</u>
22 20050281971	<u>Fully fibrous structure friction material</u>

- 23 [20050281897](#) [Agent for preventing, improving or treating hypertension](#)
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- 25 [20050281773](#) [Subtilisin variants with improved perhydrolase activity](#)
- 26 [20050281699](#) [Method for producing porous metal with micro-holes](#)
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- 30 [20050279374](#) [Reduction of phenolic compound precursors in tobacco](#)
- 31 [20050279019](#) [Cover layers to prevent weed growth](#)
- 32 [20050278800](#) [Compositions and methods for the modification of gene expression](#)
- 33 [20050277722](#) [DECREASING ALLERGENICITY OF NATURAL LATEX RUBBER PRIOR TO VULCANIZATION](#)
- 34 [20050277712](#) [Tire sealant](#)
- 35 [20050277632](#) [Beta agonists for the treatment of respiratory diseases](#)
- 36 [20050276815](#) [Antiviral activity from medicinal mushrooms](#)
- 37 [20050275701](#) [Water base ink for ink-jet recording](#)
- 38 [20050274519](#) [Methods, cement compositions and suspending agents therefor](#)
- 39 [20050274469](#) [Highly refined fiber mass, process of their manufacture and products containing the fibers](#)
- 40 [20050274467](#) [Digester wash extraction by individual screen flow control](#)
- 41 [20050273881](#) [Defensin polynucleotides and methods of use](#)
- 42 [20050273880](#) [Polypeptides having oxaloacetate hydrolase activity and nucleic acids encoding same](#)
- 43 [20050272926](#) [Non-crystalline cellulose and production thereof](#)
- 44 [20050272922](#) [Processes for preparing crosslinker-free, biopolymer-containing three dimensional structures, and products prepared thereby](#)
- 45 [20050272892](#) [Hydrolyzates of soybeans or other soy products as components of thermosetting resins](#)
- 46 [20050272726](#) [Novel medicaments for the treatment of respiratory diseases](#)
- 47 [20050272211](#) [Adjustable shims and washers](#)
- 48 [20050272134](#) [Production of a fermentation product](#)
- 49 [20050272121](#) [Site specific incorporation of heavy atom-containing unnatural amino acids into proteins for structure determination](#)
- 50 [20050272041](#) [Purified plant expansin proteins and DNA encoding same](#)

VOLUME 17

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LIGNE, lèn'yə, **Prince de** (1735-1814), soldier, diplomat, and author, whose career exemplified the aristocratic and international life style of military society in the 18th century. He was considered one of the foremost military intellectuals of his age.

Charles Joseph de Ligne was born on May 23, 1735, in Brussels, then capital of the Austrian Netherlands. A member of the princely family of Hainaut, he entered the Austrian Army and served with distinction in the battles of Kolin, Leuthen, and Hochkirch during the Seven Years War (1756-1763). A friend and adviser of Emperor Joseph II, he gained rapid promotion, reaching the rank of quartermaster general in 1784.

Well connected, witty, and wealthy, de Ligne traveled widely throughout Europe and was welcomed by learned society and at courts. He accompanied Catherine II of Russia to the Crimea in 1787 and was appointed field marshal in his army. However, when Joseph II joined Russia in war against Turkey (1788-1791), de Ligne returned to Austrian service. In 1790 he was invited to lead a Belgian revolt against Austrian rule, but he declined though he apparently sympathized with the rebels.

The French conquest of the Austrian Netherlands in 1792 deprived de Ligne of his vast estates, and thereafter he remained in Vienna. He held no active command in the campaigns against the French Revolutionary armies and Bonaparte. Instead he devoted himself to writing volumes on military affairs, literature, and philosophy. In 1809 he received the honorary rank of field marshal in the Austrian Army. He observed the opening phases of the Congress of Vienna (1814-1815) and coined the often quoted remark: "The Congress dances, but it does not move." The Prince de Ligne died in Vienna on Dec. 13, 1814.

CUNYNE E. ROTENBERG
University of New Mexico

LIGNIN, lig'nən, is a complex organic material that binds together cellulose fibers, hemicellulose molecules, and other materials in the cell walls of plants. It constitutes 20% to 30% of dry wood.

Commercial uses of lignin were developed because the paper and pulp industry needed to dispose of large quantities of waste sulfite liquor, which contains sulfonated lignin. In the manufacture of high-grade permanently white paper, lignin is removed chemically. Improved wood pulp refining and bleaching techniques have greatly increased the amount of lignin that can be allowed to remain in other types of paper, such as newsprint and wrapping paper.

Large quantities of lignosulfonates are used as additives to oil-well drilling fluids. They are also used in wood binders, industrial cleaners, boiler scale inhibitors, leather tanning agents, extenders for phenolic plastics, and cement products. Vanillin for the preparation of vanilla flavoring is made from lignosulfonates by oxidation in alkaline solution. Some lignin is used as fuel.

The chemical structure of lignin is not fully understood. Its molecular weight ranges from 2,000 to 15,000. The principal structural unit of lignin from coniferous trees is coniferyl alcohol. Lignin from deciduous trees also contains a high proportion of syringenin. Chemical changes occur in the chemical extraction of lignin, and the products of different extraction processes are not identical.

Lignin forms solutions by chemical reaction with hot alkalis or bisulfites but is insoluble in water and in organic solvents. It resists attack by strong sulfuric acid but is readily oxidized in alkaline solution.

OTTO W. NITZ, *Stout State University*

LIGNITE, lig'nit, is a brownish black form of coal. It is geologically younger than bituminous coal, and textures of the plants from which coal derives can still be seen in the material. Lignite has a lower carbon content and calorific value than bituminous coal. A dense, black variety known as *jet* is sometimes used in jewelry. See also *COAL—Kinds of Coal; JET*.

LIGNUM VITAE, a hard dense wood from guaiacum trees. See *GUALACIUM*.

LIGUORI, Alfonso. See *ALPHONSUS LIGUORI*.

LIGURIA, lē-gōō'ryā, the smallest of the regions of Italy, lies on the northwest coast of the country between the Italian-French border and Tuscany. It has an area of 2,087 square miles (5,405 sq km) and comprises the provinces of Imperia, Savona, Genoa, and La Spezia. The city of Genoa is the capital.

Liguria is a largely mountainous region, consisting of the Maritime Alps in the west and the Ligurian Apennines in the east. The two ranges are divided by the Cadibona Pass. The region's narrow coastal strip, the Italian Riviera, is known as the Riviera di Ponente west of Genoa and the Riviera di Levante east of the city.

The region, sheltered by its mountains from northerly winds, enjoys unusually mild winters and early springs. Its agricultural significance is shaped by these factors. It has vineyards, orchards, and scattered citrus groves and is known for its production of flowers and early vegetables. Coastal fishing is carried on in most towns and villages.

Genoa is the leading industrial center and the busiest port of the region. Savona and La Spezia are also noted for maritime trade. Liguria's industries include shipbuilding and the production of iron and steel, chemicals and petrochemicals, textiles, and precision machinery. Tourism represents another major source of income. The Italian Riviera is among the leading resort areas of Europe. A nearly uninterrupted string of large and small resorts extends from San Remo in the west to Sestri Levante in the east. The resort trade is a year-round business. The region has excellent rail and road links with the resorts on the French Riviera and the urban centers of the Po valley.

Liguria is named for the ancient Liguri, a people that inhabited the Mediterranean coast from the Rhône to the Arno. It was occupied by the Romans in the 2d century B.C. and was one of the nine divisions of Italy under the emperor Augustus. Dominated in early medieval times by the Lombards, Liguria later came under the sway of Genoa, which controlled the whole region by the 14th century. Population: 1,662,650 (1994 est.).

GEORGE KISH, *University of Michigan*

LIGURIAN SEA, li-gyōō'ē-an, a division of the Mediterranean Sea off northwestern Italy. It lies between the Ligurian coast, or Italian Riviera, in the north, where it includes the Gulf of Genoa, and Corsica and Elba in the south.

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Ugna, detail of a painting by Ladaroc. It is the collection of the Prince de Ligne.

Beisell
An attorney at the Office de Logis, Beisell

gia and Austria in the Russo-Turkish War of 1787-92.

De Ligne's memoirs and letters reflect his experiences as a favourite at the leading European courts and salons until his exile following the Belgian rebellion of 1789. His works include *Mélanges militaires, littéraires et sentimentaux*, 34 vol. (1795-1811); 'Miscellaneous Military, Literary, and Sentimental Memoirs', *Fragment de l'histoire de ma vie* (1927); 'Fragments of the History of my Life', and *Letters and Memoirs of the Prince de Saxe* (translated by Leigh Ashton, 1927).

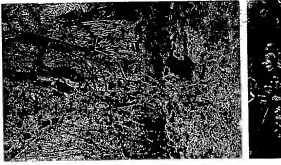
lignosus thyridifolia, also called *TYRINA* or *secos*, are called *thyridites*.

Lignin, complex oxygen-containing organic material, is the most abundant organic polymer in the plant kingdom. It forms the chief constituent of wood. It is second only to cellulose as the most abundant organic material on Earth, though it has found relatively few industrial uses other than as a fuel. It is a mixture of complex, apparently polymeric, compounds of carbon, hydrogen, and oxygen. Lignin is concentrated in the cell walls of wood and makes up 24-35 percent of the oven-dry weight of softwoods and 17-25 percent of hardwoods. It is removed from wood pulp in the manufacture of paper, usually by treating with alkali, or sodium hydroxide, or sodium sulfide.

As a solid, lignin has a number of industrial uses as a binder for particle-board and similar laminated or composite wood products, as a soil conditioner, as a filler or an active agent in cement, as a plasticizer, as a filler or a constituent of phenolic resins, and as an additive for hardboard, particle board, and plywood.

microbials. Raw lignite has a high water content, amounting to as much as 60 percent in the brown varieties; upon weathering, a large portion of this water is lost, resulting in lignite disintegration, or crumbling, of the material. Lignite also tends to disintegrate in the soil, which reduces the value of lignite as a fuel. Lignite also tends to disintegrate in the water, which reduces its value as a source of lignin. Against these drawbacks, many of the lignite beds lie close to the surface and are of great thickness, sometimes more than 30 m. The lignite is also of high quality, and the cost of production is low. See also *brown coal*.

Guaiacum officinale occurs from the southern United States to northern South America. It grows about 9 m (30 feet) tall and reaches a diameter of about 25 cm (10 inches). The evergreen leaves are opposite, divided into leaflets (arranged along an axis), and leathery in texture. The flowers are bright blue when



The Casino of Pius IV, Vatican City, by Pim
1553-62

Acetylsalicylic acid (ASA) from Ayl Pharmacia, N 25 Inc.

[illegible]

Glories of Mary—one of the most beloved manuals of devotion to the Virgin and dogmatic writings on such subjects as infallibility and the power of prayer. In the middle of the 20th century, his works through several thousand editions have been translated into 60 languages. In 1925, Luigi is known as the principal exponent of equiprobabilism, a system of principles to guide the conscience of one in either he is free from or bound by a

the third smallest of the regions of Liguria, bordering the Ligurian Sea, in the north-east part of the country. It comprises the area between the Maritime Alps and of Genoa, Imperia, La Spezia, and like a crescent reaching from the Roia River to that of the Magra. The French frontier to Tuscany, Liguria is bordered by the Maritime Alps as far as the Ligurian Apennines. Page and the Ligurian Apennines.

the narrow, pieced fringes of the Italian peninsula, the Italian peninsula is customarily divided into a western part, the Poenente Riviera, and an eastern part, the Levante Riviera, the point of division being the apex of the Ligurian arc at Genoa. Most of the population is

domination of Rome in the 1st century AD. After brief Lombard and Frankish rule, the city began to emerge as a power as early as the 11th century AD. The city had gained control of the region and become one of the principal commercial powers of Europe. Numerous conflicts with its competitor Venice, Genoa kept its independence until 1796, when it was seized by Napoleon.

Nonprofits for France. The Congress (1815) gave Liguria to the kingdom of Sardinia. Liguria played a leadership role in the Risorgimento (movement for independence) and contributed significantly to the unification of Italy. Genoa became a major port of the new unified Italy, and Genoa is the capital of Liguria. As a result, in France, the shelter from winter winds of the mountains, Liguria is particularly important in growing early vegetables, especially in the western sector, and wine grapes, and its mild climate attracts a massive tourist trade in the numerous resorts.

There are concentrated in and around Genoa, the Ligurian Sea, and provincial capital, Imperia, the towns of La Spezia, Rapallo, and Portofino. La Spezia, A Spezia, A Genoa and La Spezia are connected by a railway. La Spezia is a sheltered shipyard; La Spezia is Italy's naval base, and Savona is a major center of the chemical industry. Chemical, tex-

ent race from the Gauls or Celts, and Diosdorus mentioned that they lived in villages and made a difficult living from the rocky, unproductive soil. In any event, their reputed boldness caused them to be in great demand as mercenaries. They served the Carthaginian commander Hamilcar in 480 BC and the Sicilian Greek colonies in the time of Agathocles and openly sided with Carthage in the Second Punic War (218–201 BC). Steps were not taken for their final reduction by Rome until 180

The name *Liguria*, or *Ligures*, has been used by modern archaeologists to designate a stratum of Neolithic remains in the region from northeastern Spain to northwestern Italy. The *Ligurian* language, language spoken by the *Ligurians* in northwestern Italy (and perhaps also in southern France and northeastern Spain).

Spain in pre-Roman and early Roman times. It is apparently an Indo-European language. Some scholars have maintained that Ligurian is closely related to the Italic and Celtic languages, holding an intermediate linguistic position between them. The language is known primarily from a small number of glosses in classical writings.

Ligurian Republic, French République Ligourienne, Italian Repubblica Ligure, republic created by Napoleon Bonaparte on June 15, 1797, organizing the conquered city of Genoa and its environs. The government was modeled on that of the Directory in France, and the republic was tied to France by alliance. In 1803 it became also a military district, closely linked to France, and its chief of state became appointable by Napoleon. In May 1805 the Ligurian Republic was absorbed into the French Empire.

Liguria *Lat. Mare Ligusticum, Ital. Mare Ligure, French Mer Ligurienne, Spanish Mar Ligeo*, the northernmost of the northwestern coast of Italy. It extends between Liguria and Tuscany (south and east) and the Ligurian Sea (north and west). It receives many rivers that empty into the sea, and it may reach a depth of more than 9,300 feet (2,845 m) southwest of Genoa. The sea is connected through the Tunnels Artabrogo in the southeast with the Tyrrhenian Sea.

Liholho; see *Kamoharua II*.

Lihue, *Lat. Alexander; see* *Konehunchu II*.

Lihue, city, seat of Kauai county, in southwestern Kauai Island, Hawaii, U.S. It is the largest city on the island and the principal port and its cultural and business center. It is the seat of the county government and the economic mainstay with the foundation of the Lihue Sugar Plantation (1849) by German immigrants.

Likasi, formerly until 1917 a city, southeastern Congo along the Likasi River, 8 miles northwest of Lubumbashi, reached by road and rail. In 1917 it was a covered copper deposits. Kanabov, 15 miles (24 km) was founded in 1917 and

There are also chemical acid, glycerin) and a brewer's yeast. There are also chemical acid, glycerin) and a brewer's yeast. There are also chemical acid, glycerin) and a brewer's yeast.

The tax originated in 18 Chinese province of Kiang financing troops to aid in the Taining Rebellion 1890-6.

opening of the country to the world in the second half of the 15th century created considerable revenue for the Ming government. The government began to demand the silk revenues be made available to the treasury, and it soon began to demand the major financial supports of the government (1644-1911/12), relieving the government of the overburdened peasantry.

The tax was a constant source of conflict between the Chinese and Western trading companies. The British, who had the petty levies they got to the interior of China because of their military presence there, in 1928 China agreed to abolish the tax. The restoration of the tax, which had been taken from the "unequal treaties" signed after the Opium Wars, was a source of controversy.

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CLASS 106. COMPOSITIONS: COATING OR PLASTIC[Click here for a printable version of this file](#)**SECTION I - CLASS DEFINITION**

This class is the broad generic class for:

(1) Coating, impregnating or plastic compositions, especially those which set or harden to retain a given shape. Most of the compositions herein found are those which are capable of undergoing a change from a fluent to a nonfluent condition, or from a solid noncoherent form to a solid coherent form, which changes may be effected in any or more of the followings ways:

- (a) By setting, e.g., concrete;
- (b) By chemical reaction or conversion, e.g., viscose;
- (c) By removal of solvents or vehicles, e.g., lacquers;
- (d) By solidification from a molten state, e.g., asphalt or sulfur.

This class takes all such compositions unless more specifically provided for in other main classes, for which see the notes below under the heading "Coating or Plastic Compositions Elsewhere Classified".

The term "coating" is used throughout the definitions and notes of this class to include "impregnating".

(2) Materials or ingredients, not in themselves coating, impregnating or plastic compositions which are for use in such compositions and for which there is no provision elsewhere. Fillers or pigments for use in rubber, synthetic resins or paper are also included in this class.

(3) The line followed between sections 1 and 2 is, that patents broadly claiming coating or plastic compositions, wherein the only ingredients named do not by themselves form coating or plastic compositions, are classified in the appropriate subclasses under the heading "Materials or Ingredients", unless the coating or plastic composition has a characteristic or property specifically provided for above. Thus "a paint comprising a specific pigment" is classified on the basis of the pigment because paints as such are not provided for; however, "an ink comprising a specific pigment" would be placed under "Inks" since inks are provided for as such.

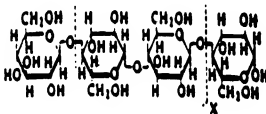
(4) This class takes processes for preparing or making the compositions, materials, or ingredients classified herein, which processes are classified with the corresponding composition, material or ingredient. It does not, however, include processes which are clearly distinct from the composition, material or ingredient, and which are more specifically provided for elsewhere. See the appropriate notes below for the lines with the pertinent process classes.

(5) This class does not include patents which are limited to apparatus only, for which see the appropriate apparatus classes. Patents containing a claim to a composition and/or process of preparing same within this class and a claim to apparatus employed in the preparation of the composition are classified on the basis of the composition or process and cross-referenced to the appropriate apparatus class.

NOTES

This subclass is indented under subclass 126.1. Compositions wherein the carbohydrate is found in a lignocellulosic material.

- (1) Note. Lignocellulosic material is raw vegetable matter consisting primarily of cellulose, primarily of cellulose and lignin, or primarily of cellulose and lignin and minor amounts of carbohydrate and resin.
- (2) Note. Lignin is a noncarbohydrate, polymeric substance found in wood and woody plants which functions as a natural plastic binder for the cellulose fibers. It is isolated directly from wood or wood products or from the treatment of wood, e.g., waste sulfite liquor or black liquor. The structure of the lignin monomer is not completely known.
- (3) Note. Cellulose is a carbohydrate consisting of repeating glucose units having the following structure:



126.3 Carbohydrate gum or cellulosic material:

This subclass is indented under subclass 126.1. Compositions wherein the carbohydrate is a carbohydrate gum or a chemically modified carbohydrate gum, cellulose or a chemically modified cellulose, or a naturally occurring material which has cellulose as one of its ingredients.

- (1) Note. Carbohydrate gums include but are not limited to arabic, tragacanth, xanthan, galactomannan, irish moss, carrageenan, karaya, agar agar, algin, guar, xylogalactan, and glucomannan.
- (2) Note. Carbohydrate gums are highly branched polysaccharides composed of two or more monosaccharides, and are exudates of plants produced by the plant to cover wounds and to prevent attack by organisms.
- (3) Note. The term "derivative" herein is intended to include a chemical modification of the carbohydrate gum or cellulose wherein the carbon skeleton of the carbohydrate gum or cellulose is not destroyed or wherein the carbon skeleton of the carbohydrate gum or cellulose is indeterminate.
- (4) Note. This subclass and indented subclasses provide for relatively pure cellulose (e.g., cotton linters, etc.), regenerated cellulose (e.g., cellophane and rayon), or chemically modified forms of cellulose (e.g., pyroxylin, viscose, etc.) for which there is no provision elsewhere.

127.1 With nonproteinaceous hetero ring compound:

This subclass is indented under subclass 125.1. Compositions which contain, in addition to the seed or tuber material, a nonproteinaceous organic compound having a hetero ring.

- (1) Note. Hetero ring is a ring having only carbon and at least one atom from the group consisting of nitrogen, oxygen, sulfur, selenium and tellurium as ring members.

128.1 With nonproteinaceous phosphorus or boron compound or organic compound containing silicon:

This subclass is indented under subclass 125.1. Compositions which contain, in addition to the seed or tuber material, a nonproteinaceous compound of phosphorus or boron or an organic compound which has at least one silicon atom therein.

- (1) Note. See this class, subclass 124.1, (4) Note for the definition of an organic compound.

129.1 With natural resin or derivative:

This subclass is indented under subclass 125.1. Compositions which contain, in addition to the seed or tuber material, a natural resin or a chemical modification of a natural resin.

- (1) Note. Natural resins include but are not limited to shellac, copals from various sources (e.g., congo, manila, etc.), amber, dammar, dead dammar, gum rosin, japan, japan varnish, rosin

Bookbinding and the Conservation of Books
A Dictionary of Descriptive Terminology



lignin

A highly polymeric material occurring with cellulose in plant material, and which is considered to be largely responsible for the strength of the wood. Lignin is usually determined as the residue left on hydrolysis of the plant material with strong acids after resins, waxes, tannins, and other extractives have been removed. Softwoods give from 26 to 34% lignin with a methoxyl content of about 15%, while hardwoods give 16 to 24% lignin with a methoxyl content of about 21%.

The nature of lignin is not fully understood, but it is considered to be a complex cross-linked, highly aromatic structure of high molecular weight, i.e., about 10,000. It cannot be hydrolyzed by acids, but is readily oxidizable. It is soluble in hot alkali and bisulfate, and condenses readily with phenol and thio compounds. Lignin is not a compound but a system, and its composition varies both with the method of isolation used and with the species, age, growing conditions, etc., of the tree or lignified material. It is more or less completely removed during chemical pulping operations in paper manufacture but none is removed by mechanical pulping. It is further removed or modified by bleaching sequences to give pulps of greater brightness.

So-called sulfite cellulose (which is more appropriately called "sulfite lignin extract"), when adjusted to a pH of between 3.0 and 5.0, has a tanning action resembling that of the vegetable tannins. When used alone, however, it produces a brown leather that tends to be thin and hard, with low tan fixation. It is used chiefly at the end of some vegetable tannages to improve the fullness and firmness of the leather, especially in those cases where the leather is to be sold by weight. ([17](#) , [72](#) , [198](#) , [268](#) , [306](#))



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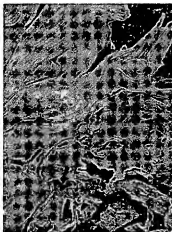
Lignin

The term lignin comes from the Latin word *lignum*, which means wood; so, plants that contain a large quantity of lignin are called 'woody'.

Lignin is characterised by being an aromatic (non-carbohydrate) complex of which there exist many structural polymers (lignin). It is convenient to use the term lignin in a collective sense to refer to the lignin fraction of fiber.

After the polysaccharides, lignin is the most abundant organic polymer in the vegetable world. It is important to point out that lignin is the only non-polysaccharide fiber known.

Lignin performs multiple functions that are essential for the life of plants. For example, it plays an important role in the internal transport of water, nutrients and metabolite. It lends rigidity to the cell wall and acts as a bridge to join the cells of wood, creating a material that is notably resistant to impacts, compressions and flexions. Indeed, lignified tissues resist the attack of microorganisms, impeding the penetration of destructive enzymes into the cell wall.



1. Chemical structure

The lignin molecule is a macromolecule with a high molecular weight resulting from the union of several acids and fenilpropylic alcohols (coumarilic, coniferilic and sinapilic). The randomised coupling of these radicals gives rise to an amorphous polymeric, three-dimensional structure characteristic of lignin.

Lignin is the most complex natural polymer in relation to its structure and heterogeneity. This is why it is impossible to describe a defined structure for lignin; nevertheless, numerous models have been proposed to represent an 'approximation' of that structure.

• Physical properties

Lignins are insoluble polymers in acids and in strong alkalis. They are not digested or absorbed and are not attacked by the micro flora of the colon. They can bind to bile acids and other organic compounds (for example, cholesterol), delaying or diminishing the absorption of these components in the small intestine.

The degree of lignification notably affects the digestibility of fiber. Lignin, which increases ostensibly in the cell wall of plants as they mature, is resistant to bacterial degradation, and its fiber content reduces the digestibility of fibrous polysaccharides.

• Commercialised lignins

There only exist two types of commercially available lignin: sulphonated lignins and kraft lignins. The eastern world's capacity to produce lignin products is approximately 1.4×10^6 tonnes/year. Only one company produces kraft lignins; the rest produce sulphonated lignins. Lignin products have begun to take on increasing importance in different industrial applications¹.

2. Bacteria translocation

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